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Response of mustard (*Brassica juncea*) to phosphorus on Vertisols of Rajasthan

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A field experiment was conducted during the rainy (*rabi*) season of 1989–90 at Udaipur, to find out the effect of phosphorus on growth, yield and oil yield of mustard [*Brassica juncea* (L.) Czernj. & Cosson] on Vertisols of Rajasthan. The experiment having 2 varieties of mustard ('Pusa Kranti' and 'Varuna') and 3 levels of phosphorus (20, 40 and 60 kg/ha) was laid out in randomized block design with 3 replications. The soil was clay loam in texture, with 270.0, 18.7 and 186.0 kg/ha of available nitrogen, phosphorus and potassium respectively. The pH of soil was 8.3. Crop season was normal, except that a few rain-showers occurred during February 1990 at Udaipur.

The varieties differed significantly for number of siliquae/plant, single plant seed yield, test weight, seed and oil yields (Table 1). 'Varuna' mustard gave the highest number of siliquae/plant, single plant seed yield and test weight as well as seed and oil yields than the 'Kranti' mustard. The results are in close conformity with the findings of Goswami (1981) and Gaur (1982).

Application of 40 kg P_2O_5/ha was found significantly superior to 20 kg P_2O_5/ha for siliquae/plant and single plant seed yield of mustard. The increase in siliquae/plant and single plant seed yield due to 40 kg P_2O_5 over 20 kg P_2O_5/ha was 7.7 and 9.9% respectively. Significantly higher seed yield was obtained with 40 kg P_2O_5/ha which was,

Table 1. Yield and yield attributes of mustard as influenced by varieties and phosphorus

Treatment	Yield attribute				Seed yield (q/ha)	Oil yield (q/ha)
	Siliquae/ plant	Seeds/ siliqua	Single plant seed yield (g)	Test weight (g)		
Variety						
'Kranti'	217.50	13.4	13.3	4.6	14.8	5.6
'Varuna'	234.2	13.6	14.2	5.0	16.5	6.4
CD (P=0.05)	11.2	NS	0.77	0.19	1.25	0.37
P (kg/ha)						
20	219.4	13.5	13.1	4.7	14.4	5.5
40	236.5	13.5	14.4	4.8	16.9	6.5
60	221.8	13.5	13.6	4.9	15.7	5.9
CD (P=0.05)	13.7	NS	0.95	NS	1.53	0.45

however, statistically on a par with 60 kg P_2O_5/ha. Application of 40 kg P_2O_5/ha gave the highest oil yield (6.5 q/ha) which was 18.2 and 10.2% higher over 20 and 60 kg P_2O_5/ha. Saran and Giri (1990) also reported an increase in yield and yield attributes of mustard due to P application.

The highest net return of Rs 10, 603/ha and benefit : cost ratio of 4.3 : 1 were obtained in 'Varuna' mustard in combination with 40 kg P_2O_5/ha.

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Performance of mustard (*Brassica juncea*) varieties to dates of sowing in rice fallow

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A field experiment was conducted during winter seasons (*rabi*) of 1986–87 and 1987–88 to study the performance of mustard [*Brassica juncea* (L.) Czernj. & Cosson] response to sowing dates in rice fallows, at Raipur. The soil was clay loam in texture with pH 6.9, having available N 129 kg/ha, P_2O_5 12 kg/ha and K_2O 335 kg/ha. Treatment comprised 3 mustard cultivars as main-plot treatment and 4 sowing dates as subplot treatment (Table 1). The experiment was taken after rice crop. The crop was fertilized uniformly with 60 kg N, 40 kg P_2O_5 and 20 kg K_2O/ha. Rainfall of 51 and 47 mm was recorded during 1986–87 and 1987–88 respectively.

Sowing of mustard on 23 November resulted in significantly more seed yield over later dates but remained on a par with sowing on 30 November. Delay in sowing by each week reduced the yield by 6, 29 and 47% during 1986–87 and 4, 17 and 43% during 1987–88, compared with sowing on 23 November respectively. The increases in number of siliqua and 1,000-seed weight were reflected by higher seed yield. The seed yield of all the varieties of mustard showed similar yields.

The weather prevailing during the growth phases had a considerable influence on seed